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Compaq ProLiant ML330 Generation 2

Service Overview

Abstract: This white paper describes the Compaq ProLiant ML330 Generation 2 Series of servers. Information provided includes features, models, option and spare part numbers, as well as installation and service considerations for the product.

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Compaq ProLiant ML330 Generation 2 Service Overview© 2001 Compaq Computer Corporation

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Product Description

This white paper announces the Compaq ProLiant ML330 Generation 2 Series of servers. The Generation 2 (G2) models support two Intel Pentium® III 1.0GHz or 1.13GHz processors with Flip-Chip Pin Grid Array (FC-PGA) technology and either 256KB or 512KB, respectively, of Level 2 (L2) ECC cache memory.

The ATA models have an integrated dual channel Ultra ATA 100 controller with integrated ATA RAID that can provide a maximum internal storage capacity of 160GB by using four 40GB one-inch ATA/100 drives (two internal drive bays and two removable media bays). In addition, the 128MB standard ECC SDRAM DIMM memory for both ATA and SCSI models is now expandable up to 4GB.

Features

- Support for up to two 1.0 Coppermine or 1.13 Tualatin GHz Pentium® III Processors with FC-PGA technology, and 133MHz front-side bus (FSB)
- Integrated 256KB (1.0GHz models) or 512KB (1.13GHz models) of L2 full speed cache
- 128MB of PC133-MHz ECC registered SDRAM DIMM standard, expandable now to 4GB
- Integrated ATA RAID Configuration Utility with 0, 1, and 0+1 capabilities
- Compaq Integrated Dual Channel Ultra ATA 100 Adapter (ATA models) or Integrated Dual Channel Wide Ultra3 SCSI Adapter (SCSI models)
- Either a non-hot plug 18.2GB Wide Ultra3 SCSI 10,000 rpm (SCSI models) or 20GB Ultra ATA/100 7200 rpm hard drive (ATA models)
- Maximum of 160GB of internal storage (ATA models), 182GB (SCSI models)
- Seven internal drive bays:
  - One 1.44MB carbon floppy diskette drive
  - Four 5.25" x 1.6" removable media bays, one filled with 40X IDE CD-ROM drive
  - Two 3.5 x 1" Non Hot Plug (NHP) hard drive bays
  - Up to five 1" Wide Ultra3 NHP SCSI, or four 1"ATA NHP drives are supported.
- Internal Two-Bay Hot-Plug SCSI Drive Cage option
- Six expansion slots (5 available):
  - Four 64-bit/33MHz PCI
  - One 32-bit/33MHz PCI
  - The Server Feature Board
- Two USB ports
- Integrated ATI Rage XL video controller — upgraded to 8MB SDRAM

- Two new ROM technologies:
  - Compaq Remote ROM Flash Utility
  - Redundant ROM
- Upgraded from Automatic Server Recovery (ASR) to ASR-2, and upgrade to SmartStart version 5.20
- Pre-Execution Environment (PXE) support—enables remote configuration and installation of operating system
- ROM-Based Setup Utility (RBSU) (**F9** setup) for system configuration—simplifies server setup and enables support of the Compaq SmartStart Scripting Toolkit
- A 5U rack enabling kit option offered
- ML330 chassis with modifications and baffles to support dual processors
- Compaq NC3163 Fast Ethernet PCI 10/100 Wake on LAN (embedded) NIC
- 300W power supply
- 1-1-1 warranty, Pre-Failure Warranty covering processors, memory and hard drives

Processor Technology

In addition to the changes bulleted above, the 1.13 Tualatin FC-PGA2 processors now include an integrated heat spreader above the flip-chip core, making them easier to cool. They also now have an attached heatsink, solving the problems faced when the processor and heatsink were separated and then reattached.

An integrated VRM 8.5 powers the first processor; a socketed +12V input VRM 8.5 powers the second. .13 –micron technology enables smaller, less expensive chips that run faster and require less power.

Integrated ATA RAID Configuration Utility

The Integrated ATA RAID Configuration Utility is a standard feature of ProLiant ML330 Generation 2 ATA models. It supports, configures, and manages ATA hard drive arrays.

The AMI PCI-649 ATA100 controller provides two internal 100MB/s ports for up to four drives. Integrated ATA RAID allows the user to install the operating system onto a fault-tolerant volume.

To run the utility, press the **F8** key during POST, after all hard drives have been installed and connected. Unlike a RAID volume created with an operating system, this server's ROM-based setup is used to create RAID 0, 1, and 0+1 arrays and assign drives. This information is then written to a configuration sector on the drives. For further instruction on how to use this utility refer to the Setup and Installation Guide. (See *References* at the end of this document.)

Note: The ROM-based RAID setup is not part of RBSU.

Compaq Integrated ATA RAID Management Utility

This is an application installed from SmartStart that provides array monitoring and reporting by:

- Monitoring the drives for failures
- Sending alerts to the operating system. (Compaq Insight Manager monitors the system separately from the ATA RAID Management Utility.)
- Initiating automatic rebuilds (either to an online spare or to the new drive.)

With integrated ATA RAID, the operating system can be installed on a pre-configured mirror (RAID 1 volume). Regardless of which drive fails, recovery of the mirror after replacing the drive does not require user or operating system intervention.

ROM-Based Setup Utility (RBSU)

Like its predecessor, RBSU lets you view and establish server configuration settings during initial system startup, as well as modify them after the server has been configured. Because the file operates from the system ROM (unlike previous configuration utilities stored on a hard drive):

- The configuration parameters are always available, even if a drive fails.
- It only takes 3 to 5 seconds to run the utility (vs. 3 to 5 minutes).
- You can quickly install the latest version by flashing the system ROM with the latest ROMPaq version.

In addition, RBSU checks each setting as it is made and immediately resolves possible conflicts without bothering the administrator with an audible warning message. And, because it is embedded in the ROM, you can use the Compaq Remote Insight Lights-Out Edition to remotely access and configure the system.

Compaq Remote ROM Flash Utility

This utility allows administrators to upgrade the system ROMs as well as the supported Compaq Smart Array controllers on multiple servers from a remote location. The ROM upgrades can either be flashed individually or batched together to perform multiple ROM upgrades all at once.

Redundant ROM

If the server either loses power during a ROM flash or if the flash process is otherwise interrupted, redundant ROM allows you to restart the system with the original ROM image.

Redundant ROM also allows you to use RBSU to switch between two ROM images for testing and evaluation purposes. Through RBSU, you can restart the server using the previous ROM image if a new ROM flash doesn't meet your expectations — eliminating the need to use the ROMPAQ Flash Utility to fall back to the previous ROM version.

Automatic Server Recovery-2 (ASR-2)

Like ASR, ASR-2 resets the system in the event of a catastrophic operating system error and it restarts the server within a predetermined amount of time after the system stops responding. For ASR-2, however, system administrators can set the interval in the RBSU.

Next Generation Remote Insight Support

The ML330 G2 has two connectors on the system board to support Remote Insight, Lights-Out Edition boards. The 16-pin connector will support the existing board, while the 30-pin connector will support the next generation board.

Enhanced Fan Control

A temperature-sensing device located near the processors now monitors the temperatures of both processors and the ambient temperature of the chassis. When any of these three temperatures reaches a predefined limit, the fan speed increases to control the temperature in the system.

Server Feature Bus

The Server Feature Bus is a proprietary bus that has PCI and management signals. Running the management signals through this bus eliminates the need for the System Management Interface Cable (SMIC) that was compulsory in the first generation ML330.

Server Feature Board

The server feature bus slot, located at the bottom of the system board, houses the Server Feature Board. This board contains the ATA or SCSI, NIC, video, and management controllers.

There are two Server Feature Boards — one for the SCSI models, the other for the ATA models. Other than the drive controllers and associated connectors, the two boards are identical. The SCSI models ship with only a SCSI drive controller; the ATA models ship with only an ATA drive controller.

NMI Debug Button

The NMI Debug button is located on the Server Feature Board. NMI is a diagnostic mechanism that allows for crash dump files to be created in situations when a system is hung and unable to respond to traditional debug mechanisms. The NMI Debug button can be used to diagnose software failures by forcing the operating system to invoke the Non-Maskable Interrupt (NMI) handler and generate a crash dump log. This log can provide critical troubleshooting information that may be difficult or impossible to obtain through other means.

The user initiates a Non Maskable Interrupt (NMI) by pressing the NMI Debug button. The NMI can allow a hung system to become responsive enough to generate a crash dump log. The button is enabled/disenabled in RBSU.

Warning! The NMI Debug button causes the unit to abruptly fail, as it is designed to do. Therefore, it should never be used during normal operation.

ASR-2 is used when an *automated* crash dump is desired. Normally, ASR-2 provides a system reset; however, ASR-2 can be configured to generate the NMI Crash Dump instead of a reset.

Internal Two-Bay Hot-Plug SCSI Drive

This is an option which is installed in the server's removable media bay area which will allow the customer to add two additional hot-plug SCSI hard drives or a combination of one hot-plug SCSI hard drive and one hot-plug SCSI tape drive.

LEDs

In addition to the system LEDs (on the front of the server) and network controller LEDs (on the back of the server), the ML330 G2 now includes 15 diagnostic LEDs on the system board. These LEDs indicate error conditions, such as processor, PPM, or memory module failures. Refer to the graphic and table on the following pages to determine what these lights indicate.

For detailed information on the system and network controller LEDs, refer to Appendix E in the Setup and Installation Guide. (See *References* at the end of this document.)

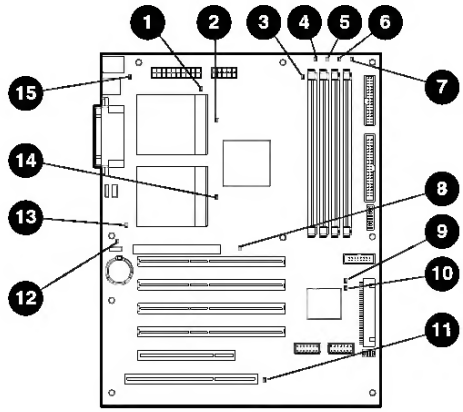


Table 1: System Board LEDs

Item	Description	Status	Means
1	AC power	Off	The AC power cord is not plugged into the power supply or the power supply failed.
		Green	Power supply is on and functioning.
2	Processor 1 thermal	Off	Processor 1 temperature normal
		Amber	Thermal trip for processor 1 detected. Verify: ▪ Heatsink is properly installed. ▪ Server fans are properly installed and working. ▪ Ambient temperature is within an acceptable range[1].
3	PPM 1 (integrated) failure	Off	PPM 1 functioning
		Amber	PPM 1 failed
4	DIMM 1 failure	Off	DIMM1 functioning
		Amber	DIMM 1 failed
5	DIMM 2 failure	Off	DIMM 2 functioning
		Amber	DIMM 2 failed
6	DIMM 3 failure	Off	DIMM 3 functioning
		Amber	DIMM 3 failed
7	DIMM 4 failure	Off	DIMM 4 functioning
		Amber	DIMM 4 failed
8	PPM 2 failure	Off	PPM 2 functioning
		Amber	PPM 2 failed or missing (if the corresponding processor is installed)

[1] See Appendix F, "Specifications," in the *Compaq ProLiant ML330 Generation 2 Server Setup and Installation Guide* for operational temperature requirements. (See *References.*)

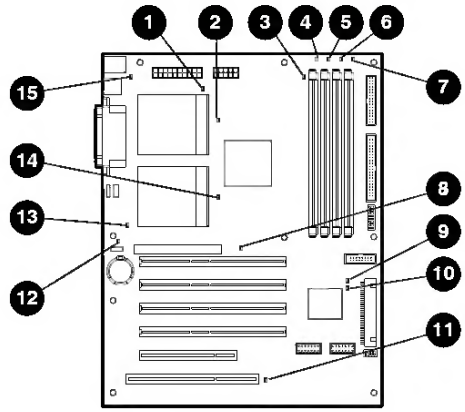


Table 1: System Board LEDs (continued)

Item	Description	Status	Means
9	Health	Off	Normal (system in standby mode)
		Green	Normal (system powered on)
		Amber	System degraded
		Red	System critical
10	Temperature threshold	Off	Temperature is normal
		Amber	Temperature threshold exceeded
11	Server Feature Board installation failure	Off	Server Feature Board is installed properly
		Amber	Server Feature Board is not installed properly
12	System fan failure	Off	Fan is functioning
		Amber	Fan is not installed or has failed
13	Processor 2 failure	Off	Processor 2 functioning
		Amber	Processor 2 failed
14	Processor 2 thermal	Off	Processor 2 temperature normal
		Amber	Thermal trip for processor 2 detected. Verify: ▪ Heatsink is properly installed. ▪ Server fans are properly installed and working. ▪ Ambient temperature is within an acceptable range[2].
15	Processor 1 failure	Off	Processor 1 functioning
		Amber	Processor 1 failed or missing

[2] See Appendix F, "Specifications," in the *Compaq ProLiant ML330 Generation 2 Server Setup and Installation Guide* for operational temperature requirements. (See *References.*)

Models

Table 2 lists configurations for the new models:

Table 2: System Models

Model	Part Number	Config. Code	Processor	Hard Drive
ML330T02 P1000-256KB 128-MB, ATA	234664-001*	JVQ1	1.0GHz	None
ML330T02 P1000-256KB 128-MB, 20-GB, ATA	234664-002	JVQ2	1.0GHz	20GB
ML330T02 P1000-256KB 128-MB, SCSI	234665-001	JVA1	1.0GHz	None
ML330T02 P1000-256KB 128-MB, 18GB, SCSI	234665-002	JVA2	1.0GHz	18.2GB
ML330T02 P1133-512KB 128-MB, ATA	225859-001*	JVT1	1.133GHz	None
ML330T02 P1133-512KB 128-MB, 20GB, ATA	225859-002	JVT2	1.133GHz	20GB
ML330T02 P1133-512KB 128-MB, SCSI	225860-001	JVV1	1.133GHz	None
ML330T02 P1133-512KB 128-MB, 18GB, SCSI	225860-002	JVV2	1.133GHz	18.2GB

*These ATA models will only be for CTO support through Custom Edge Inc. (CEI).

Option Kits

Table 3 lists the most important options:

Table 3: Processor Option/Upgrade Kits

Kit	Part Number
Processor Kits	
Pentium III P1000-256KB Processor Option Kit	245037-B21
Pentium III P1133-512KB Processor Option Kit	238888-B21
Memory Kits	
64-MB PC133-MHz Registered ECC SDRAM DIMM Memory Option Kit	128276-B21
128-MB PC133-MHz Registered ECC SDRAM DIMM Memory Option Kit	128277-B21
256-MB PC133-MHz Registered ECC SDRAM DIMM Memory Option Kit	128278-B21
512-MB PC133-MHz Registered ECC SDRAM DIMM Memory Option Kit	128279-B21
1024-MB PC133-MHz Registered ECC SDRAM DIMM Memory Option Kit	128280-B21
Hard Drive Kits (Non-Hot Plug)	
20-GB ATA/100 7,200 rpm Drive (1")*	231377-B21
40-GB ATA/100 7,200 rpm Drive (1")*	230534-B21
18.2-GB Wide Ultra3 SCSI 10,000 rpm Drive (1")**	142674-B21
36.4-GB Wide Ultra3 SCSI 10,000 rpm Drive (1")**	176497-B21
Misc.	
Tower to Rack Enabling Kit	238547-B21
Internal to External SCSI Kit	159547-B22

*ATA models only

**SCSI models only

Refer to the *QuickSpecs* for a more complete list of options. (See *References*.)

Spare Parts

Ordering information for individual spare processors with heatsinks, system boards, and the hard drive for these models is shown below:

Table 4: Spare Part Numbers

Description	Spare Part Number
Pentium III Processor, 1-GHz/133 with heatsink	245245-001
Pentium III Processor, 1.133-GHz/133 with heatsink	239324-001
System board	241485-001
Server Feature Board (SCSI models)	241489-001
Server Feature Board (ATA models)	245246-001
Cable Kit, ATA/CD/Diskette	253826-001
20-GB ATA/100 (NHP)* hard drive	230699-001
40-GB ATA* hard drive	232008-001
18.2-GB Wide Ultra3** hard drive	152191-001
Rack Enabling Kit	249443-001

*ATA models only

**SCSI models only

For a full listing of spare parts for the ProLiant ML330 Generation 2 Series of servers, refer to:

- *Compaq ProLiant ML330 Generation 2 Server Maintenance and Service Guide* (See *References*.)
- *Quick Reference Guide ProLiant ML330/Generation 2* (listed as *ML330 Generation 2 Quick Reference Guide* on the website)

These documents are available at:

http://www.compaq.com/support/servers/ProLiantML330.html

http://www.compaq.com/support/techpubs/

Operating Systems

The ProLiant ML330 supports the following operating systems:

- LINUX products (RedHat, SuSE, Caldera eServer) (SCSI models only)
- Microsoft 2000 BackOffice Small Business Server 2000
- Microsoft Windows 2000 Server
- Microsoft Windows NT Server 4.0
- Microsoft Window NT Server 4.0 terminal Server Edition
- Novell NetWare 5.1 (SCSI models only)
- Novell NetWare Small Business Suite 5.1(SCSI models only)

For a more complete listing and current listing of supported operating systems and versions, refer to the following Compaq website:

ftp.compaq.com/pub/products/servers/os-support-matrix-310.pdf

Drivers

The ProLiant ML330 Generation 2 servers feature new hardware that does not have driver support on all operating system installation media. Use SmartStart and its Assisted Path feature to install your operating system and the latest driver support.

If you do not use SmartStart to install your operating system, drivers for some of the new hardware are required. These drivers, as well as other option drivers, ROM images, and value-add software can be downloaded from :

www.Compaq.com/support/files/server/us/index.html

Manageability & Utilities

The ProLiant ML330 ships with the following:

- Compaq Insight Manager™ and Compaq Insight Manager XE™
- Compaq SmartStart™ version 5.20 support (minimum)
- Array Configuration Utility (ACU and ACU-XE) with Smart Array controllers
- Compaq Management Agents
- Automatic Server Recovery-2 (ASR-2)
- Drive Parameter Tracking and Dynamic Sector Repairing (both with Smart Array Controller)
- Pre-Failure Warranty (covers processors, memory, and hard disk drives)

Installation Procedures

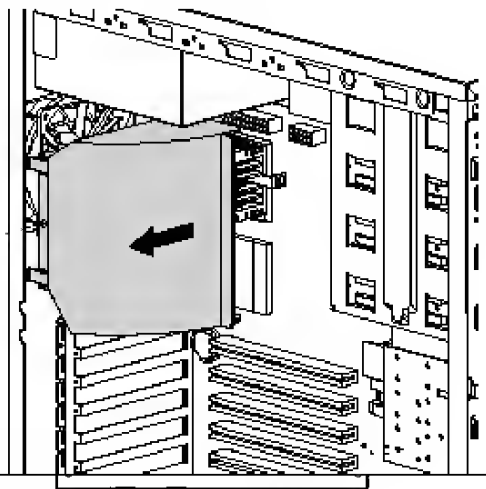
Processors

The Proliant ML330 G2 comes standard with an Intel Pentium III processor. Its corresponding Processor Power Module (PPM) is integrated on the system board. An optional processor and PPM can be installed.

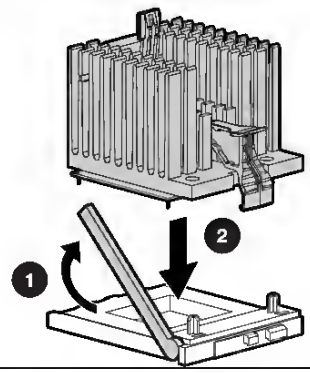
Important:

If you install more than one processor, both processors must be the same type and speed. The CPU1 socket must always be populated before the CPU2 socket.

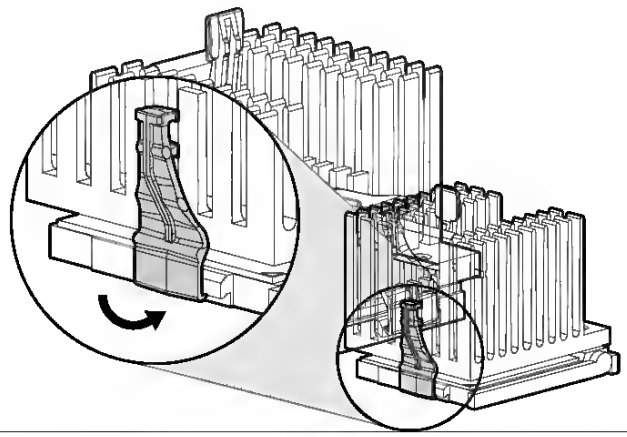
Table 5: Processor Installation

Step	Action
1.	Verify that all critical data has been backed up.
2.	Ensure the server has the most current ROM version. To update the ROM, visit: http://www.compaq.com/support/files/server/us **Caution:** Failure to flash the ROM before installing a new processor can cause system failure.
3.	Remove the Access Panel. (Refer to Setup and Installation Guide, listed under References.)
4.	Remove the internal fan baffle that covers the processor sockets by unseating the baffle and sliding it out and away from the chassis. 
5.	Locate the processor sockets and PPM 2 slot: **Item** **Description**

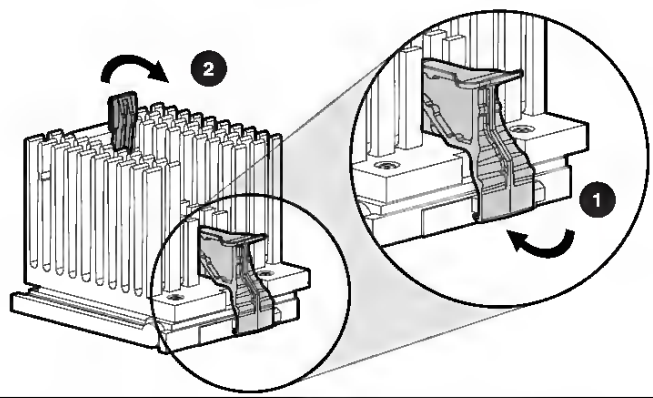
Step	Action
	Processor socket 1 (populated) Processor socket 2 PPM 2 slot



6.	Raise the processor socket lever, and then place the processor into the socket, as shown below: The guide posts and directional key marks on the socket must be aligned with the corresponding slots and marks on the processor.
7.	Lower the processor socket lever, as shown below:



8.	Secure the heatsink retainer clip on the back of the processor to the socket, as shown

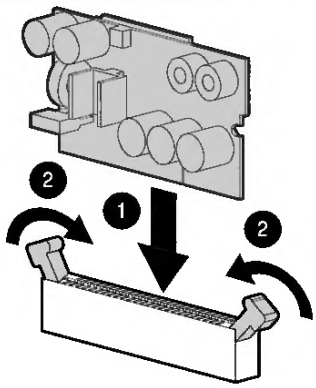
Step	Action
	below:
	
9.	Secure the assembly clip on the front side of the processor to the socket, and then lock the processor in place by pressing down on the assembly clip lever. **Caution:** Applying too much pressure on the lever could break it. Use care when performing this step.
10.	Install the corresponding PPM before powering up the server. (See *Installing the PPM for Processor 2*.)
11.	Reinstall the fan baffle by reversing Step 4.

Installing the PPM for Processor 2

Perform the following steps to install the PPM corresponding to the second processor:

Table 6: Processor Power Module (PPM) Installation

Step	Action
1.	Align the PPM with the PPM slot.
2.	Slide the PPM into the slot until the latches snap securely into place :



Memory

The ProLiant ML330 G2 supports registered 133MHz ECC SDRAM DIMMs. The memory bus and controller are not compatible with older 100MHz DIMMs.

Standard memory in all ML330 G2 models is a single 128MB DIMM. Memory can be expanded one DIMM at a time in the four memory sockets provided.

Integrated ATA RAID Troubleshooting Tips

Drive Connection

- If you have two drives, connect one per channel. The performance of the array is best with one drive per channel, with both drives residing on the master connection of their channel.
- Use the same type of drives or drives with similar speed and capacity.
- Do not use dissimilar drives on the same channel.
- Always use 80-conductor Ultra ATA cables.
- Use appropriate jumper settings[3].
- Do ***not*** connect any ATAPI devices (e.g., CD-ROM, ZIP, or LS120 drive) to the ATA controller.

[3] Refer to Appendix E, "LED Indicators, Switches, and Jumpers" in the *Setup and Installation Guide*. (See *References*.)

Configuration and Setup

Important:

- If you do not run the configuration utility setup (F8), the option ROM will automatically configure the drives to RAID 0.
- You cannot add drives or remove drives from an array that has already been configured.
- All previous settings are lost when the Auto Configure option is run for RAID 0, RAID 1, and RAID 0+1 arrays.
- RAID configurations do not support a stripe size less than 32KB.
- You cannot change the stripe size of an array that has already been configured.
- Enabling write cache (under WC-OFF) may cause data loss or corruption during an unexpected power loss.

If you need to change array configuration, first back up your data. When an array configuration changes, previous data in that array is lost. Use the table below to troubleshoot configuration and setup problems:

Table 7: Troubleshooting Configuration and Setup

Problem	Cause	Solution
Unexpected message, e.g. *Drives Missing* or *Configuration Mismatch*	Loose connection	Switch off the system and verify all connections, ATA cables, and power cables.
Configuration Mismatch message after adding new drives	The new drives have been used before and the configuration on the drives was not cleared	Press **F8** during POST to go to the Integrated ATA RAID Configuration Utility, and create the array configuration as needed.

Installing a Smart Array Controller

The embedded ATA does not have to be disabled. Ensure that the boot volume is listed first in the boot order under RBSU.

Service Considerations

There are no specific considerations for the ProLiant ML330 G2 servers.

References

For information on servicing and troubleshooting the Compaq ProLiant ML330 Server refer to the:

- *Compaq ProLiant ML330 Generation 2 Server Maintenance and Service Guide* First Edition (September 2001) Part Number 234832-001 or spare part number 176670-001.
- *Compaq ProLiant ML330 Generation 2 Server Setup and Installation Guide* First Edition (August 2001) Part Number 234833-001.
- *Compaq ProLiant ML330 Generation 2 (G2) QuickSpecs*, DA-10523.
- *Servers Troubleshooting Guide,* Part Number 161759-004.
- *Quick Reference Guide ProLiant ML330/Generation 2*

Note: For online searches, enter *ML330 G2* to search for information about the ProLiant ML330 G2. Entering *ML330* will bring up only information about the first generation server.